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Development of an approach to geochemical modeling of super-viscous oil deposits, Tatarstan, Russia

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Abstract

© SGEM2018. The development of the world oil industry shows a significant growth of interest to the super-viscous oil deposits. One of the technologies for extracting super-viscous oil is Steam-Assisted Gravity Drainage technology, which has been developed in the 1970s and is still used, including in the Republic of Tatarstan, Russia. Determination of the direction of steam chamber growth, the main operating factor of this method, is the main task of modeling heavy oil deposits. In this paper authors propose modeling of the heavy oil deposits based on geochemical analysis data. The concentration of the chemical compounds, which can be used as indirect indicator of the organic matter`s biodegradation degree, is chosen as key parameter for modeling. As a part of this work the geochemical analysis of core samples from evaluation wells and oil samples from producing wells were carried out. Examination included hydrocarbon fraction isolating and GCMS analysis. Then there have been determined key biomarkers and their concentrations. Based on distribution of biomarkers' concentrations, geochemical model were constructed. It made possible to define oil flow directions during the development of heavy oil fields by SAGD method, and hence the possible boundaries of the steam chamber.

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Keywords

Biodegradation, Biomarkers, Geochemical modeling, Super-viscous oil

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